

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

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(FILE 'HOME' ENTERED AT 13:02:08 ON 13 MAY 2003)

FILE 'HCAPLUS, INSPEC, JAPIO, USPATFULL, USPAT2' ENTERED AT 13:02:21 ON  
13 MAY 2003.

L1	1905563 S (SUBSTRATE OR WAFER)
L2	1536 S (HEAT? OR ANNEAL?) (8A) (LINBO3 OR LITHIUM(W)NIOBATE OR LITAO3
L3	231 S (LINBO3 OR LITHIUM(W)NIOBATE OR LITAO3 OR LITHIUM(W)TANTALATE
L4	2742812 S (ATMOSPHERE OR AIR)
L5	323 S L1 AND L2
L6	10 S L1 AND L2 AND L3 AND L4

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5/14/03

=&gt; d 16 1-10 abs, bib

L6 ANSWER 1 OF 10 HCAPLUS COPYRIGHT 2003 ACS  
 AB Li in-diffusion and out-diffusion processes in **LiNbO3** crystals, when **annealed** in **Li2CO3 powder**, were investigated via 2nd-harmonic-generation phase-matching temp. measurement by using a YAG laser. After annealing at 600.degree. for >52 h in **Li2CO3**, in-diffused Li ions caused a slight decrease in the ordinary refractive index near the surface of the polished **LiNbO3 substrate**. These samples showed a large decrease in extraordinary refractive index after being annealed at 1050.degree. in **air**. Wrapping the **LiNbO3 substrate** in Pt foil to prevent direct contact with the **Li2CO3 powder** was a successful method to suppress Li out-diffusion without surface degrdn.

AN 1981:609805 HCAPLUS

DN 95:209805

TI Lithium in- and out-diffusion processes in lithium niobate(V)

AU Fukuma, Masaharu; Noda, Juichi

CS Musashino Electr. Commun. Lab., Nippon Telegr. Teleph. Corp., Musashino, 180, Japan

SO Japanese Journal of Applied Physics (1981), 20(10), 1861-5

CODEN: JJAPAS; ISSN: 0021-4922

DT Journal

LA English

✓ L6 ANSWER 2 OF 10 INSPEC COPYRIGHT 2003 IEE

AN 1984:2289123 INSPEC DN A84081130; B84041102

AB The preparation of lithium niobate films on Corning 7059 glass by RF planar magnetron sputtering in an Ar+40% O2 mixture has been studied at 2 mtorr. Films deposited on unheated substrates became crazed by release of a tensile stress arising from the difference between the expansion coefficient of the glass and the coating. Improvement of surface cleanliness by discharge cleaning or solvent degreasing using iso-propyl alcohol in a Soxhlet extractor enhanced the film/**substrate** adhesion. This prevented crazing, but the transparent films produced were still under stress. Glass surfaces cleaned sufficiently for high film adhesion had a coefficient of static friction, glass on glass, of greater than approximately 0.8. A **lithium niobate powder** target was used because the uneven **heating** arising from magnetron discharge localization resulted in fracture of single crystal material. Care was taken to remove all water vapour from the discharge **atmosphere** using liquid nitrogen traps, for without these the coatings produced were optically absorbing, due to oxide reduction, presumably formed by an active hydrogen reaction. The refractive index of the films, as determined from their waveguiding characteristics, was in the region of 2.10-2.20. Trial coatings grown at 380 degrees C and above had indices in the region of 2.19; these high temperature films were also transparent but under tensile stress. The growth rates ranged from 9.5 AA min-1 for a **substrate** temperature of 380 degrees C to 11.5 AA min-1 for a **substrate** temperature of 470 degrees C.

DN A84081130; B84041102

TI Magnetron sputtered lithium niobate films.

AU Meek, P.R.; Holland, L. (Plasma Process Lab., Univ. of Sussex, Brighton, UK)

SO Vacuum (March-April 1984) vol.34, no.3-4, p.411-15. 10 refs.

Price: CCCC 0042-207X/84\$3.00+.00

CODEN: VACUAV ISSN: 0042-207X

Conference: Proceedings of the SIRA International Seminar on Film Preparation and Etching using Vacuum or Plasma Technology. Brighton, Sussex, UK, 22-24 March 1983

DT Conference Article; Journal

TC Practical; Experimental  
CY United Kingdom  
LA English

L6 ANSWER 3 OF 10 INSPEC COPYRIGHT 2003 IEE  
AN 1982:1797182 INSPEC DN A82016845

AB Li in-diffusion and out-diffusion processes in **LiNbO3** crystals, when treated in **Li2CO3 powder**, were investigated through second harmonic generation phase matching temperature measurement using a YAG laser. After annealing to 600 degrees C for more than 52 hours in **Li2CO3**, in-diffused Li ions caused a slight decrease in the ordinary refractive index near the surface of the polished **LiNbO3 substrate**. These samples showed a large decrease in extraordinary refractive index after being **annealed** at 1050 degrees C in **air**. Wrapping the **LiNbO3 substrate** in platinum foil to prevent direct contact with the **Li2CO3 powder** was found to be a successful method to suppress Li out-diffusion without surface degradation.

DN A82016845

TI Li in- and out-diffusion processes in **LiNbO3**.

AU Fukuma, M. (Musashino Electrical Communication Lab., NTT, Tokyo, Japan); Noda, J.

SO Japanese Journal of Applied Physics (Oct. 1981) vol.20, no.10, p.1861-6  
CODEN: JJAPA5 ISSN: 0021-4922

DT Journal

TC Experimental

CY Japan

LA English

L6 ANSWER 4 OF 10 INSPEC COPYRIGHT 2003 IEE  
AN 1974:669412 INSPEC DN A74061282

AB The authors report the possibility of obtaining oriented **LiNbO3** films by discrete evaporation in a vacuum of  $1 \times 10^{-5}$  to  $5 \times 10^{-6}$  mm. To minimize contamination of the condensate, as an evaporator a rhenium plate heated to 2100 degrees C was used. To obtain oriented films, powdered synthetic **LiNbO3** was first **heated** for 1 h at 1200 degrees C in **air** in a platinum boat. After heating it was crushed to a powder with a particle size of less than 60  $\mu$ . The rate of evaporation was regulated by the frequency of a vibrator which fed the **powder** to the evaporator. Films of **LiNbO3**, up to 1500 AA thick, were condensed on the surface of silver films with the (111) orientation, grown epitaxially on mica. The silver films, at least 3000 AA thick, were grown by condensation at 270-300 degrees C immediately before deposition of the **LiNbO3**. The film structure was studied under a UEMV-100K electron microscope after separation from the **substrate** by dissolution of the silver.

DN A74061282

TI Growing epitaxial films of **LiNbO3**.

AU Postnikov, V.S.; Levlev, V.M.; Zolotukhin, I.V.; Rodin, G.S.

SO Inorganic Materials (Aug. 1973) vol.9, no.8, p.1299-300. 4 refs.

CODEN: INOMAF ISSN: 0020-1685

Translation of: Izvestiya Akademii Nauk SSSR, Neorganicheskie Materialy (Aug. 1973) vol.9, no.8, p.1455. 4 refs.

CODEN: IVNMAW ISSN: 0002-337X

DT Journal; Translation Abstracted

TC Experimental

CY USSR; United States

LA English

L6 ANSWER 5 OF 10 USPATFULL

AB Chemical and electrical poling is described, as well as an improved optical converter having a solid state body which employs the same.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AN 1998:11751 USPATFULL  
TI Method of controlling regions of ferroelectric polarization domains in solid state bodies  
IN Byer, Robert L., Stanford, CA, United States  
Fejer, Martin M., Menlo Park, CA, United States  
Lim, Eric J., Menlo Park, CA, United States  
PA The Board of Trustees of the Leland Stanford Junior University, Stanford, CA, United States (U.S. corporation)  
PI US 5714198 19980203  
AI US 1994-225500 19940411 (8)  
RLI Continuation of Ser. No. US 1989-305215, filed on 1 Feb 1989, now patented, Pat. No. US 5035220  
DT Utility  
FS Granted  
EXNAM Primary Examiner: Bell, Janyce  
LREP Flehr Hohbach Test Albritton & Herbert LLP  
CLMN Number of Claims: 11  
ECL Exemplary Claim: 1  
DRWN 5 Drawing Figure(s); 3 Drawing Page(s)  
LN.CNT 624  
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L6 ANSWER 6 OF 10 USPATFULL

AB The invention relates to an electric field sensor useful in detecting and measuring wideband transient electrical responses by means of an integrated optical waveguide interferometer. Mach-Zehnder devices are produced wherein one waveguide channel has been reverse poled, or has domain inversion, preferably by means of titanium diffusion into said waveguide channel. Also produced is an electrode-less optical interferometer modulator by which an optical output signal is modulated at the same frequency as an applied electric field.

AN 93:101504 USPATFULL  
TI Electro-optical sensor for detecting electric fields  
IN Sriram, Sriram S., Powell, OH, United States  
Kingsley, Stuart A., Columbus, OH, United States  
Boyd, Joseph T., Cincinnati, OH, United States  
PA Srico, Inc., Powell, OH, United States (U.S. corporation)  
PI US 5267336 19931130  
AI US 1992-878420 19920504 (7)  
DT Utility  
FS Granted  
EXNAM Primary Examiner: Gonzalez, Frank  
LREP Rainear, Dennis H.  
CLMN Number of Claims: 30  
ECL Exemplary Claim: 1  
DRWN 5 Drawing Figure(s); 5 Drawing Page(s)  
LN.CNT 943

L6 ANSWER 7 OF 10 USPATFULL

AB An integrated optical waveguide is constructed from a lithium niobate (LiNbO<sub>3</sub>) crystal **substrate**. In preferred embodiments, a diffused layer is formed proximate to one surface of the **substrate** by sputtering a thin layer of a zinc-related oxide (e.g., ZnO, ZnLiNbO<sub>4</sub>, or the like) onto the surface and then annealing the **substrate**. The resulting concentration of zinc in the diffused layer forms a waveguide having desirable optical propagation characteristics. The **substrate** is preferably congruent lithium niobate. In particularly preferred embodiments, the **substrate** is magnesium oxide (MgO) doped lithium niobate.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AN 92:19459 USPATFULL  
TI Integrated optical waveguide utilizing zinc oxide diffused into  
congruent and magnesium oxide doped lithium niobate crystals  
IN Young, Whu-ming, Stanford, CA, United States  
Fejer, Martin M., Menlo Park, CA, United States  
Feigelson, Robert S., Saratoga, CA, United States  
Digonnet, Michel J. F., Palo Alto, CA, United States  
PA The Board of Trustees of the Leland Stanford Junior University,  
Stanford, CA, United States (U.S. corporation)  
PI US 5095518 19920310  
AI US 1990-566153 19900810 (7)  
DT Utility  
FS Granted  
EXNAM Primary Examiner: Ullah, Akm  
LREP Knobbe, Martens, Olson & Bear  
CLMN Number of Claims: 25  
ECL Exemplary Claim: 1  
DRWN 14 Drawing Figure(s); 7 Drawing Page(s)  
LN.CNT 597

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L6 ANSWER 8 OF 10 USPATFULL  
AB A mode converter comprises an a-axis  $\text{LiNbO}_3$  optical fiber  
exhibiting a ferroelectric bi-domain structure. The fiber is subject to  
an electrical field that induces a  $+\pi/2$  phase retardation in one  
domain of the fiber and a  $-\pi/2$  phase retardation in the other domain.  
A light signal launched in the fundamental mode of the fiber is  
converted into a light signal propagating in the second order mode. When  
the electrical field is selected so that the phase retardations are not  
multiples of  $\pi/2$ , the mode conversion is partial and the  $\text{LiNbO}_3$   
fiber can operate as an optical switch or as an amplitude modulator. The  
mode converter can also be operated as a second harmonic generator. The  
fiber is heated to a phase matching temperature so that a signal  
launched in the fundamental mode of the fiber and at a frequency  $\omega$ .  
is converted to the second order mode at a frequency  $2\omega$ . The  
 $\text{LiNbO}_3$  fiber can also simultaneously operate as an optical switch  
and as a second harmonic generator. Other non-linear interactions are  
possible such as sum or difference frequency generation or parametric  
generation. The various embodiments of the present invention are  
reciprocal.

AN 92:5083 USPATFULL  
TI Bi-domain two-mode single crystal fiber devices  
IN Cordova-Plaza, Amado, Woodland Hills, CA, United States  
Shaw, Herbert J., Stanford, CA, United States  
PA The Board of Trustees of the Leland Stanford Junior University,  
Stanford, CA, United States (U.S. corporation)  
PI US 5082349 19920121  
AI US 1990-541091 19900620 (7)  
RLI Continuation of Ser. No. US 1989-345078, filed on 28 Apr 1989, now  
abandoned which is a continuation-in-part of Ser. No. US 1988-186045,  
filed on 25 Apr 1988  
DT Utility  
FS Granted  
EXNAM Primary Examiner: Ullah, Akm  
LREP Knobbe, Martens, Olson & Bear  
CLMN Number of Claims: 34  
ECL Exemplary Claim: 1  
DRWN 36 Drawing Figure(s); 11 Drawing Page(s)  
LN.CNT 2086

L6 ANSWER 9 OF 10 USPATFULL

AB Thin film epitaxial layers of mixed oxide compounds, or of solid solutions of two mixed oxides, are deposited on a suitable single crystal **substrate**. Growth is achieved by introducing the **substrate** into a crucible containing a saturated solution of the oxide(s) in a molten alkali metal halide having additional undissolved oxide(s) present in the crucible. Evaporation of the alkali metal halide solvent produces and/or maintains the supersaturated condition, which is relieved by epitaxial deposition of the oxide(s) onto the **substrate**. When two mixed oxides are dissolved in the solvent, the composition of the film is determined and fixed by the temperature of growth. To produce a thin film of a constant composition, growth is conducted isothermally. To produce a thin film with a graded composition throughout its thickness, growth is conducted by slowly cooling the temperature of the solution. Excess, undissolved oxide is kept in a region of the crucible such that the undissolved oxide is several degrees hotter than the liquid in contact with the **substrate**. This condition results in additional oxide dissolving in the solvent as elsewhere the oxide is being deposited onto the **substrate**. This method of epitaxial growth provides good control of both the film composition and the film thickness.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AN 77:666 USPATFULL  
TI Method for growing thin epitaxial layers of a non-linear, optically active material  
IN Robinson, Lawrence B., Cambridge, MA, United States  
Powazinik, William, Marlboro, MA, United States  
PA GTE Laboratories Incorporated, Waltham, MA, United States (U.S. corporation)  
PI US 4001076 19770104  
AI US 1974-531570 19741211 (5)  
DT Utility  
FS Granted  
EXNAM Primary Examiner: Emery, Stephen J.  
LREP Kriegsman, Irving M.  
CLMN Number of Claims: 23  
ECL Exemplary Claim: 1  
DRWN 1 Drawing Figure(s); 1 Drawing Page(s)  
LN.CNT 507

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L6 ANSWER 10 OF 10 USPATFULL

AB A single crystal of lithium tantalate is pretreated to diffuse lithium atoms into the crystal. Niobium is then diffused into the pretreated crystal to form an optical waveguide.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AN 76:67943 USPATFULL  
TI Method of preparing optical waveguides  
IN Phillips, William, Princeton, NJ, United States  
PA RCA Corporation, New York, NY, United States (U.S. corporation)  
PI US 3997687 19761214  
AI US 1973-569858 19750421 (5)  
DT Utility  
FS Granted  
EXNAM Primary Examiner: Schmidt, William H.  
LREP Bruestle, Glenn H., Morris, Birgit E., Harcarik, Joseph T.  
CLMN Number of Claims: 7  
ECL Exemplary Claim: 1  
DRWN 1 Drawing Figure(s); 1 Drawing Page(s)  
LN.CNT 188